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Into Upland Papua

by S. V. SYKES

The author made several protracted journeys into the little-known interior of Papua and New Guinea as part of the programme of geological exploration which is being carried out by the Australasian Petroleum Company Pty Ltd, to whom he is indebted for permission to publish the following article

GEOLOGICAL reconnaissance in search of likely country for oil takes the surveyor to some remote places; and I have visited none less influenced by modern civilization than the jungle-covered, mountainous region lying inland from the coasts of Papua, which has been a British possession for seventy years, and extending to that part of New Guinea which, formerly German, has been administered by the Australian Government since World War I.

For reasons which will be apparent, the establishment of administrative control is a slow business and over much of the region it has not progressed very far. The population is tucked away in small pockets and the villages or village groups are in a state of incessant warfare, peaceful intercourse between them being virtually unknown. In their isolation, each of the groups has developed its own tongue; one can well believe the statement that over four hundred different languages are spoken in Papua and New Guinea. Along the Papuan coast, after more than a century of trade, a simplified form of Motuan, the language spoken near the administrative capital, Port Moresby, had been developed as a *lingua franca*. Officially adopted and adapted as "Police Motuan", the use of this is gradually spreading in Papua. In New Guinea, the *lingua franca* is "Pidgin English", which was used by traders and missionaries in the days of German rule. But in the interior no common language exists.

The way thither lies up the courses of the rivers—the Fly, Strickland and Sepik. Our exploring parties set out from Port Moresby on the first stage of their journeys by air; either by flying boat, making for the nearest safe stretch of water to the area to be explored, or by light aircraft,

landing on the most suitably located government airstrip. From there onwards we travelled as far as the rivers would take us by canoe. The canoes (dugouts) had to be made on the spot: various sizes, from forty to eighty feet in length, were required. A nucleus of native labourers having previously been assembled, small parties of these examined the surrounding jungle for suitable trees (large softwood trees, as the canoes were to be discarded after a few months), felled them, and shaped the dugout with axes and adzes, from six to eight men producing a reasonably good canoe in about five days. The smaller canoes, propelled with paddles, were used for human transportation; the larger for carrying camp equipment and stores. Fitted with 25-horsepower outboard motors, these would haul loads up to two tons at a speed of ten knots along the wide lower reaches of the rivers.

As we travelled upstream movement became slower. A sharp lookout had to be



A. J. Thornton



All photographs by the author

The only highways into the jungle-covered interior of New Guinea are the rivers; upon them the oil-surveying parties of which the author was a member travelled by canoe. Dugouts were made on the spot from large soft-wood trees by Papuan labourers, and were discarded after a few months

kept to avoid the hazards of overhanging trees and innumerable snags in the form of anchored sunken logs. Log dams and trees which had fallen and bridged the river had to be cut away, often taking several hours. Finally the limit of navigation was reached, either when some forest giant completely blocked the river, or when the rapids became too steep or turbulent, or when, in a dry spell, the water-level had sunk too low.

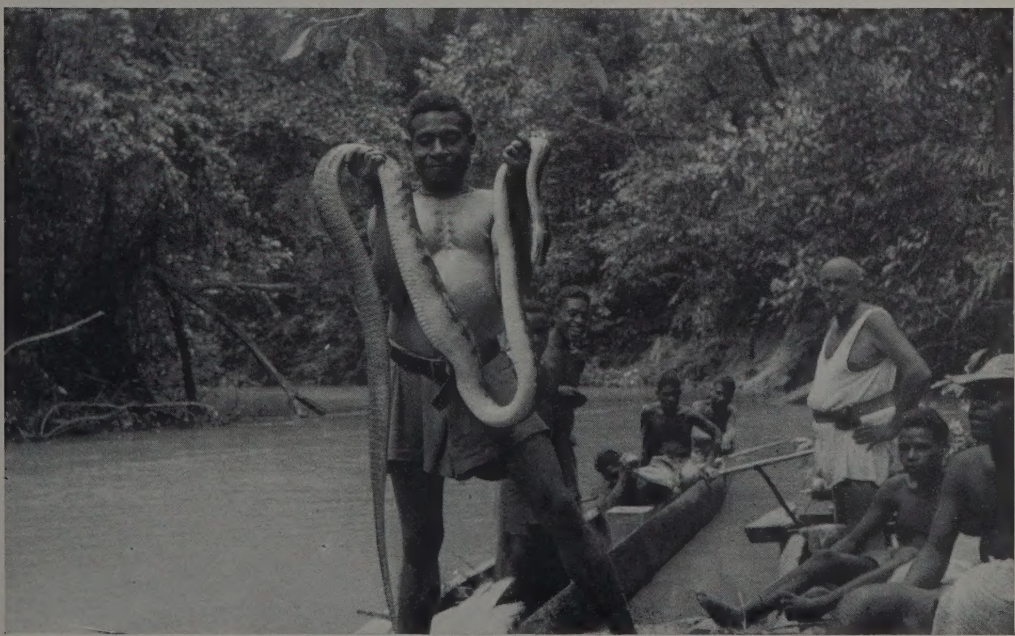
The rest of the journey could only be made on foot. In unpopulated or thinly populated country this was a most arduous means of travel, as native tracks were few and far between. The only method of progress was to cut a track through the jungle: in favourable circumstances we could cut about four or five miles of very narrow track in a day; but over rough ground or when we encountered such obstacles as cliffs or wide streams, the daily rate of advance was sometimes reduced to a mile.

Where the population was fairly dense, tracks linked village to village and many tracks went to hunting grounds or to 'garden areas' cleared in the jungle for cultivation. Using these tracks, we were occasionally able to cover as much as ten miles of rugged mountain country in a day; but we had to go where they led, since travel was practically restricted to them. So we found ourselves involved in some unsought climbing (or at least scrambling) and in crossing swift mountain streams by flimsy suspension bridges which we used with trepidation, as our European weight was up to twice that of the natives—and the bridges were built to support the local weight!

In order to cover a reasonable amount of country we broke camp before daybreak and moved off at first light. It was possible thus to spend some time searching for a suitable camp-site in the afternoon. When canoeing we could shelter ourselves by slinging



(Above) Fitted with outboard motors, double canoes with bamboo platforms were used for transporting bulky loads up the lower reaches of the Papuan rivers. (Below) Pythons, often to be seen along the river banks, were considered a tasty meal by the inland Papuans. This one was later cooked and eaten





Travel in upland New Guinea away from the rivers was sometimes made easier by native tracks; but these might lead to flimsy suspension bridges over mountain streams, built by the Papuans to bear only their own light weight—two or three saplings lashed together and hung from trees by vines

tarpaulins; but these were heavy and when walking we often dispensed with them, each night building rough shelters thatched with leaves. The limestone country presented a peculiar problem: despite the tropical rains, streams were non-existent and emergency water supplies had to be carried. In the evenings we usually collected enough rain-water for drinking and cooking, but the only safe way to proceed in such country was to move through it as quickly as possible and carry several drums of water. The reason for the absence of surface water was, of course, that it drained straight down through the rock into underground streams. On one occasion, however, after ten days and nights of continuous heavy tropical rain, a stretch

of this limestone country started to become waterlogged and we experienced a severe flood. We retreated towards the major river that we had left six days previously and on approaching within a mile of it were greeted by a wide expanse of tree-covered limestone pinnacles sticking out of a swirling torrent of water. Normal progress was impossible as the deep sinkholes and crevices, now hidden by the flood-waters, presented formidable dangers. We progressed by felling large trees and bridging the worst parts and swimming and wading through the easier places until, after twelve hours, we had covered a distance of 1900 feet. The jagged limestone then became alluvium-covered, making progress much easier, and in a few hours we reached

the main river. We were able to move slowly downstream along the natural 'levees' formed by its banks; and after felling several large trees to construct rafts, got back to our main base camp.

Food was always a problem. Local supply could not be guaranteed as the game was often sparse or almost non-existent and the area often uninhabited or the people at war or hostile to strangers. So full rations for the whole party had to be portered. Rice, flour, sugar, tea, tinned meats and other canned food, tobacco and matches comprised the bulk of our requirements. The length of a walking trip was determined by the amount of food we could carry. We could not carry more than about two months' supplies as extended supply lines were impracticable, and too many return trips were wasteful and slowed down operations. After about six weeks of travel a base camp was set up and, unless an old garden site could be located,

the next few days were spent clearing a strip of jungle to receive further supplies by drop from aircraft. Then contact was established with headquarters either by radio direct, or in one case by runner to the nearest radio-manned outpost, and final location of the air-drop site was given. Clearings, such as ours, were very difficult to locate in the almost featureless jungle and ground smoke-signals were used to assist the aircraft. Breakable items were dropped in parachute-suspended containers and non-breakables were free-dropped.

When passing through new or little-known villages it was rare to meet anyone save a few old people: most of the inhabitants were hiding in the surrounding jungle. However, a few gifts of handkerchiefs and beads and small knives to the old men generally allayed suspicion. We then made camp within close walking distance and in the next day or two the villagers gradually appeared on the scene, having overcome their initial fears and

For protection against tropical rains and to avoid carrying heavy tarpaulins when walking across country, the survey parties built rough shelters each night and these were thatched with leaves





The length of a walking trip in the Papuan jungle was determined by the amount of food the survey parties could carry; their provisions were replenished by air. (Above) A Catalina aircraft free-dropping supplies of rice and flour. (Below) Clearing a site for this purpose might take two weeks



shyness. Small amounts of food—almost entirely vegetable—were produced and exchanged for trade goods: the most popular were machetes, hatchets, coloured cloth, small knives, mirrors, beads, tobacco, matches, salt and various types of shell. After a time the villagers usually gave valuable information about tracks which sometimes saved weeks of arduous cutting through the jungle. In all cases extreme care and diplomacy had to be exercised owing to the state of incessant warfare between the villages. Our strength was such that attack was rarely contemplated but a questionable action on our part, or moving on before we were 'accepted' by the local people, was sufficient to cause passive resistance in the form of completely deserted villages. Or the people would refuse to act as guides, would not offer any food for trade and would not give information about tracks.

However, once the populace realized that the party was friendly, and strong enough to offer protection against the ever-warring surrounding villages, several of the young men would often join us as guides and porters, in order to see something of the outside world. Sometimes they stayed with us for several months and were then taken to Port Moresby to work for perhaps a year, after which they were returned, with their 'spoils' of accumulated trade goods, to their villages or to the nearest place from which they could safely get home. In many cases, after a few days' journey from home, the young men decided they had reached a point beyond which they could no longer return in safety, their fear of their neighbours overcame their wish to travel, and they went home forthwith.

As we progressed inland, communication with the people became increasingly difficult; but we found that by using as many as four interpreters some understanding could be reached. A man might speak more than one language because his mother had been abducted from a neighbouring hostile tribe and had taught her son her own tongue as well as the local one. Such a man who had also picked up a smattering of Police Motuan was invaluable. Communication was always liable to be interrupted, since if we asked anything that the people did not wish us to know, it was sufficient to cause the chain of interpretation to break down. But with patience—in one case we waited four days for 'permission' to move through a disputed area—and tact and a judicious handout of presents we usually managed to achieve friendly relations.

The inhabitants of the lowland villages often lived in one huge communal house. Raised from the ground perhaps six feet, built of timber and thatched with palm-leaves, these houses were about thirty feet wide and commonly over two hundred feet long. The women wore hip-length bushy grass skirts, and anklets and arm-bands made from plaited tree fibre or beads, while the men wore a kind of sporran made from bark or in some cases cloth, and anklets of plaited fibre and various nose and ear ornaments. Ears were pierced and the holes enlarged to take small bamboo rings.

In the highlands the men sometimes wore head-dresses made from parrot or bird-of-paradise feathers and occasionally from the fur of various marsupials. Masculine nose-decorations were commonly a boar's tusk through the lower fleshy part and a pair of cassowary quills or elephant-beetle feelers through the sides of the nostrils. The highland villages consisted of a number of smallish houses, each house accommodating perhaps one family of six to ten people. In the relatively cold climate of the highlands these houses—rudely constructed of logs, thatched with grass, and raised about three feet from the ground—could not be kept warm enough without a fire at night and the house entrance, a mere hole in a wooden shield, was made as small as possible to exclude the wind. But the presence of a number of people and several pigs and dogs in one house assured a certain amount of bodily warmth.

One house, usually at the end of the village and larger than average size, was set aside for the men and was known as the House Tamboran. This was the men's club-house, where they talked, relaxed and debated policy, and could only be used by initiates. Initiation is the passing of ritualistic tests by the youths. After passing many tests (varied according to the locality) and obeying certain fetishes, the youths are said to be initiated into a state of manhood and are then accorded the privileges of men.

Much superstition surrounds these places but in one village in the mountainous head-water country of the Sepik river we obtained permission from the village elders to enter the House Tamboran. This was achieved by climbing up a ladder to the entrance some twelve feet above ground. Inside, the walls were covered with trophies of the chase, hundreds of lower and upper jaws of wild pigs, while in a string bag were several human bones and skulls: remains of venerable ancestors used in magic-making. In one



Papuan lowlanders of the middle reaches of the Strickland river outside one of their large communal houses, which were thatched with palm-leaves and were sometimes over 200 feet in length

corner was a thin rounded disc of stone with a hole in the centre and a diametrical pattern painted upon it. This stone may have been a remnant of some earlier culture but it was alleged to have dropped from the skies. We were told that a stick was pushed through the hole and then, garlanded with vines and flowers, it was used by the fight leaders to lead the men into battle. The House Tamboran was in a bad state of repair, in fact the floor was so rickety that we had to hold onto vines suspended from the roof so as not to fall through; but its repair was taboo—it would be rebuilt when it fell down, but not until then.

The House Tamboran was absolutely taboo to the women, who were not even allowed to cast their eyes upon it. When passing through the village in its direction the women kept their eyes down and did not

pass by the men's track but took a separate path, carefully avoiding the immediate locality of the house.

The size of the people varied greatly even within one village and the only general observation one could record is that the women were usually heavier than the men, probably due to the fact that they did most of the manual labour, leaving the men free to hunt and talk. The men also cleared areas of jungle for future 'gardens' by ring-barking or felling the trees.

The men invariably carried bows and arrows for hunting and for protection. The bows were made from a particularly hard small palm-tree and were about six feet long. Arrows were made from cane, about four feet long, and were tipped with razor-sharp bamboo for hunting, with barbed black palm and barbed bone (usually cassowary) for



All Kodachromes by the

(Above) A village in the mountainous headwater country of the Sepik river, comprising (in contrast to lowland villages) a number of smallish grass-thatched houses. (Below) Masculine face-decoration in the highlands: a boar's tusk through the lower part of the nose, elephant-beetle feelers through the sides





In the highlands of New Guinea the men sometimes wear head-dresses made from plumes of the bird of paradise. No birds of this family are to be found elsewhere than in New Guinea or Australia

hunting and fighting, and with pronged heads for fishing.

Around their hips the men wore thin bands of cane. These were not ornamental but were used for fire-making. We saw this done several times in the highlands. A piece of partly split dry soft wood was wedged open and placed on the ground over a small bundle of kindling—dry grasses and grass seed. Then a length of the thin cane was taken and looped under the open end of the soft wood and pulled rapidly to and fro, while the wood was held down under the foot. The friction-developed heat soon burnt through the cane and ignited the kindling which was picked up and gently blown upon until it burst into flames. Most of the men carried a small fibre

plaited bag around their necks in which they stored dry fluffy grass seed. Dry, soft wood was easily obtained, even in the wet jungle, from the insides of the huge fallen trees, so fire-making was usually a relatively simple operation.

Such is still the state of mankind in the remote interior. But it should not be supposed that similar conditions obtain in the more accessible parts of Papua. By way of contrast I may describe the Coronation ceremonies at which I was fortunate to be present on one of my returns to Port Moresby.

At ten o'clock in the morning the procession, which included a detachment of the armed forces, ex-servicemen and groups representing such organizations as the schools,



(Above) Papuan highlanders making fire. A piece of partly split dry soft wood is held down with the foot while a length of thin cane, looped under the split, is pulled rapidly to and fro. The heat thus engendered soon burns the cane and ignites a bundle of kindling placed under the wood, which is blown upon until it bursts into flame. (Left) Enjoying their triumph over the elements, the highlanders sit contentedly round the blaze.



The Coronation of Queen Elizabeth was celebrated with great enthusiasm at Port Moresby in Papua, the administrative capital, and, after a formal ceremony of homage on the parade ground, was the occasion of lively displays of dancing by (above) girls and (below) men from villages of the coastal districts





A Papuan dancer wearing a large intricate head-dress which had been made with great care, embodying a red, white and blue theme, especially for the Coronation festivities. The spectators behind him afford evidence of the community of many races to which he and his fellow-countrymen belong in the parts of New Guinea that are under Australian administration



A "man of distinction" from a village near Port Moresby who came in for the Coronation ceremonies. His necklace of large, heavy shells represents much wealth and prestige

Guides and Scouts, started the march to the parade ground. The route was lined with thousands of spectators. We saw a detachment of the Papuan Constabulary in perfect step, looking every inch a crack rifle regiment; the Hula cricket team, blue-capped and in spotless white uniforms, almost surpassing the marching of the Constabulary; and the children, white and black alike, marching along in and out of step but all united in paying homage to their Queen.

The Administrator gave an address in Motuan and English to the assembled crowds and after the firing of the salute we sang the National Anthem.

The procession re-formed and marched away from the parade ground; and shortly afterwards, under the blazing tropic sun on the tree-hedged oval of grass and sand, with the ocean in the background, the Papuan peoples gave their dances. Some had been prepared for the Coronation and others were the traditional village dances. Spectators from far and near gazed on this lively scene. I tried to imagine the feelings of the men from the interior who were present at the ceremony. Today they were not only seeing motor-cars and paved roads and other unfamiliar marvels; they were also seeing people of many colours, races and creeds living together in complete peace; were seeing their fellow-men as integral components of a huge community—as members of ships' crews, medical assistants, police, troops, mechanics and artisans of all types—and were themselves accepted as part of that community. By a journey of a few hundred miles they had exchanged the life of primitive man for that of modern civilization, meeting other Papuans not long removed from their own condition of incessant conflict, yet now able to pursue a harmonious existence in contact with a variety of new ideas and techniques which, if not all necessarily beneficial, do mean an immense enlargement of their mental and spiritual horizon.

Here, then, instead of being perpetually at war, the Papuans

have learnt to dwell at peace with one another and with the outside world. That world may live under the shadow of far greater conflicts; yet the scope of peaceful intercourse and endeavour is also immeasurably greater. We may sometimes think that we should like to reverse the Time Machine and return to an imagined Golden Age of primitive man: no-one could wish to do so who has seen how narrow, in fact, are the bounds within which his life is restricted.

The Story of Beer

III. From the Brewery to the Bar

by BRIAN SPILLER

Mr Spiller's first two articles dealt with the origin of beer and brewing in different countries, their social relationships and the influence on them in England of similar activities elsewhere. His last article describes modern brewing, with its complicated, scientific and rigidly controlled processes, as well as the varying social status and internal nomenclature of our English pubs

BREWING was a domestic art for thousands of years before it became an industry. Up to the early part of the 19th century, countrymen in great houses, farms and cottages made their own beer, using the simple rules practised in the mediaeval abbey. Even the "capital brewhouses" of mid-Georgian London differed from the family brewhouse in size, rather than methods; and though Thrale's Anchor Brewhouse was among the marvels of the age, its equipment was crude in comparison with the vast and elaborate plant of the modern brewery, designed to ensure scientific control at every stage of the brewing process. Even by standards of size it would be dwarfed, for example, by Bass's brewery, maltings and stores at Burton-on-Trent, which cover 750 acres, or an area greater than Hyde Park, Kensington Gardens and St James's Park put together.

The technical advances thrown up by the Industrial Revolution heralded the change from hit-or-miss methods to scientific control. The thermometer came into use after 1760. Then in 1784 the invention of the saccharometer enabled strength to be accurately measured. From now on beer could be brewed to a desired specific gravity. By the employment of these precise measuring instruments, objective investigation of brewing processes could be made for the first time. Even so, virtually nothing was known about the chemistry or the biology of brewing until 1876, when Louis Pasteur published *Etudes sur la bière*. After research in breweries, Whitbread's included, Pasteur was able to prove that the yeast which brought about fermentation was in fact a living organism, capable of self-reproduction, and so minute that millions of yeast-cells weigh only an ounce. His successors established that the apparently simple process of making beer from barley is in fact a series of complex chemical and biological changes.

The first of these occurs in malting, or the

controlled germination of barley-corns by artificial means. A cross-section of a barley-corn, examined under a microscope, reveals that seven-eighths of its contents is taken up by a food reserve—packets of insoluble starch and insoluble protein—separated from the germ or embryo by a membrane. With the coming of spring, the corn develops tiny roots and leaves, and a chemical change takes place whereby the membrane produces enzymes or digestive ferments which percolate upwards, attacking and dissolving the starch and protein so that the growing plant can use them as food. It is this process that the maltster induces, rigidly controls and arrests before the food reserve is consumed.

When a consignment of barley arrives at the maltings, its moisture is reduced to about twelve per cent to encourage even germination. Then it is passed through screens to remove dirt and defective corns before being steeped in cisterns of cold water. Here it remains for forty or seventy hours, according to the season. The water is drained off and the soaked barley is spread out at an even depth on the malting floor. Within a day or so the temperature of the mass of barley starts germination, indicated by the appearance of tiny rootlets. From now on growth is regulated by increasing or decreasing the depth of the barley. By the time that the rootlets are three-quarters of an inch long the process has gone far enough. The insoluble starch has been dissolved by an enzyme known as *cytase*, and at any moment another enzyme, *diastase*, will convert the starch into sugar, a stage which must be postponed until later. So the barley is transferred to a kiln, where heat passing up through a floor of perforated tiles checks growth and also dries and cures the malt, for that is what the grain has now become. The rootlets, rich in nitrogen, are used in poultry and cattle foods.

Various kinds of malts are produced by kilning selected varieties of barley in different



Topical Press

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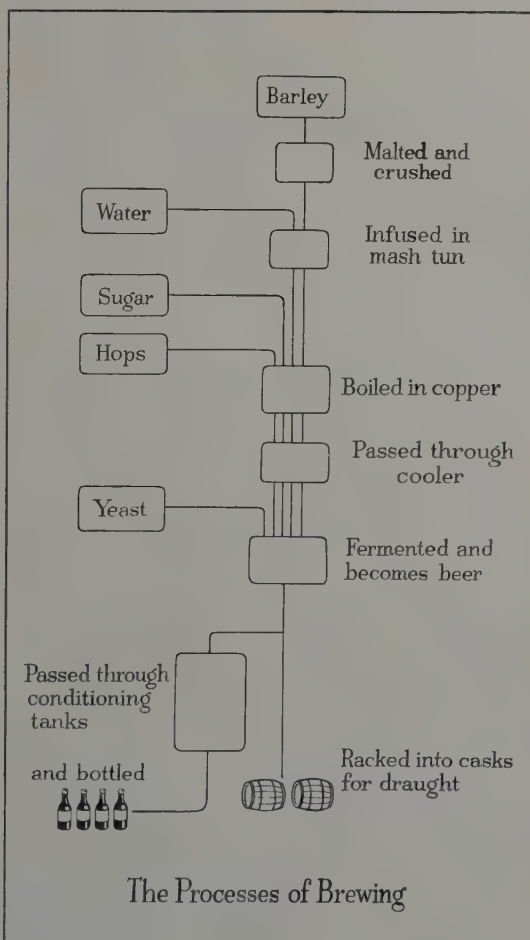
This scene at Ightham in Kent is eloquent of the close-knit continuity of English village life. The 14th-century church and the 16th-century George and Dragon both fulfil ancient community needs. They have been neighbours from a distant past, linked by traditions such as that which the Morris-dancers represent to an age when petrol-pumps are provided for the convenience of the inn's customers; and in one respect at least these are no different from earlier travellers, for the young man with his girl on the pillion behind him—whether he bestrides a palfrey or a motor-bicycle will call for a pint of English ale to quench a thirst that does not change with the centuries

ways. The brewer's art lies in choosing his malts carefully and in blending them skilfully in the mash tun with the right sort of water. Therefore the quality of the barley and of the water are of the first importance. Most British counties grow barley, though not necessarily of the right type or of the same quality season after season. Conditions of soil and climate, as well as the variety grown, influence the brewer's choice. For the most part he buys from the counties of the eastern seaboard between the Channel and the Firth of Forth. His water (which he invariably calls "liquor") is of course uncontaminated, but that is not enough, since all waters contain mineral salts and the proportions have a decisive influence on flavour. For some types of beer it is essential to use a very hard water, and many breweries have drilled private wells to obtain it.

Before the malt delivered to the brewery can be 'mashed', or mixed with water, it must go through a screen to remove any remaining foreign matter, and then to mills where steel rollers lightly crush the corns. While the brewer enters in the Excise Charge Book the exact quantities and types of all materials he is going to use, his assistants warm up the mash tun. This is a large circular vessel made of iron, copper or stainless steel, with movable inspection hatches. Here a revolving shaft fitted with paddles has mixed the crushed malt and scalding water into a porridge. The mixture is left to infuse for about two hours, and once again certain natural changes take place. The diastase becomes active, converting the starch in the malt into various malt sugars, the most important being maltose and dextrin. When the conversion is finished, the resulting clear liquid, known as 'wort', tastes exceedingly sweet. Thanks to the mash tun's perforated false bottom, the wort is strained off—leaving the spent husks behind for eventual conversion into cattle-cake—pumped to a copper and boiled vigorously for another two hours. Boiling sterilizes the wort and stops any further action by the diastase.

At this stage hops are added, or rather, the dried ripe female flowers of the hop vine. These give beer its bitter tang and refreshing aroma, while some of the resins contained in lupulin, a golden dust found in the seeds, help to preserve the soundness and stability of the brew. Most English hops are grown in Kent and Sussex, Worcestershire and Herefordshire, that is, in areas where great depth of good soil encourages the best growth. After picking, the flowers are taken to the oast-house and dried by regulated hot air passing up through porous floors.

During the boiling the resinous matters from the hop are dissolved. The leaves contribute nothing to the flavour and are





(Left) In England and Wales about two million acres are devoted to barley, the brewer's chief raw material, and in a good season the crop may exceed 2,000,000 tons, of which some 600,000 are malted for brewing. The Archer varieties—bred as a result of experiments which the industry encouraged—are generally preferred by brewers and malsters, but the search for an ideal strain of barley continues at the Plant Breeding Institute and at Guinness's barley breeding station near Warminster. (Below) 'Pokes' or sacks filled with freshly picked hop flowers being delivered to a Kentish oast-house. Here they will be dried for about twelve hours by heat passing up through the porous floors of the cone-shaped kilns seen on the right. Hops are grown only for brewers. There are under a thousand growers in England, including five brewing firms which produce their own hops

G. T. Holford



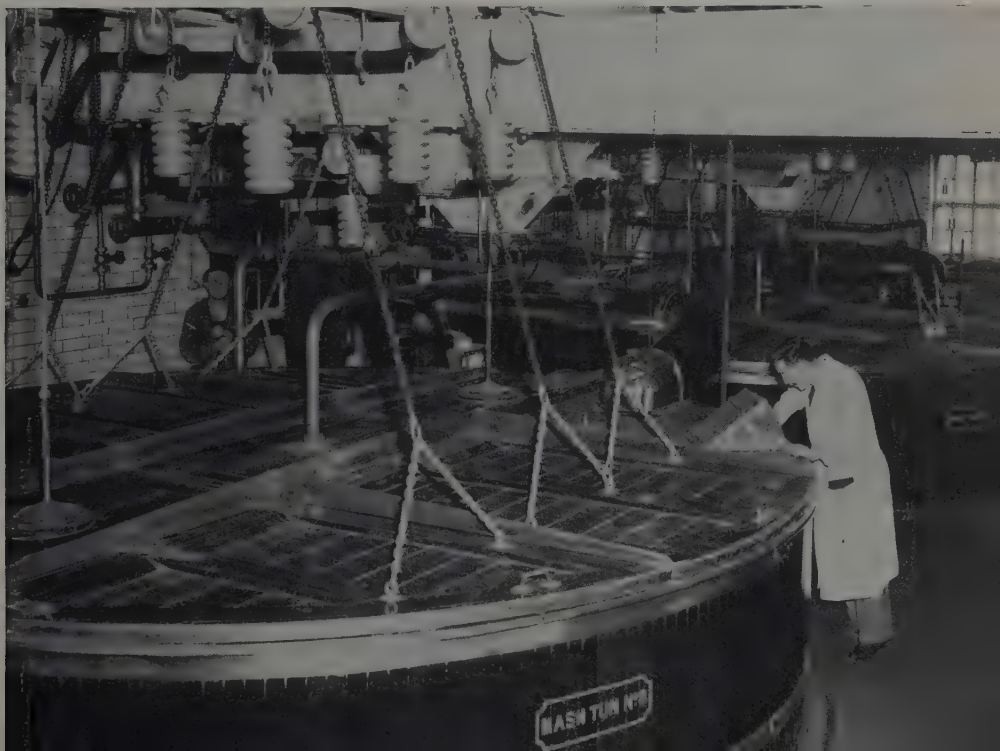
By courtesy of Whitbread & Co., Ltd

(Right) Harvested barley is induced to germinate artificially in the maltings by skilful control of its temperature. This is done by spreading it evenly over the floor, and by hand-turning. Different types of forks and shovels are used, according to the stage that growth has reached; most of them are made of wood, to avoid damage to the corns. Finally these are roasted in a kiln where the heat checks their growth and dries and airs them. They have now become malt, and the starch in their food-cells is ready for conversion into malt sugars in the brewery mash tun.

(Below) At the brewery hot water and crushed malt are mashed or mixed into a sort of porridge before entering the mash tun. Here the mash infuses under controlled temperatures for two hours, after which it has been converted into 'wort', a clear syrupy liquid with an extremely sweet malty flavour



By courtesy of Mitchells & Butlers, Ltd





By courtesy of Ind Coope & Allsopp, Ltd

After mashing, wort is sterilized by being boiled in a copper; hops are now added for flavour. Then it is cooled and run to the fermenting vessels shown above, to be 'pitched' with yeast. The 'cauliflower heads' on the surface indicate that the yeast is converting the malt sugars into alcohol and carbon dioxide gas or, in other words, changing wort into beer

strained off for use in the processing of fertilizers. Now the wort is almost ready for conversion into beer. After being cooled to a temperature of about 60°, it passes through mains to the fermenting vessels, where its specific gravity is measured by a saccharometer and duty assessed accordingly by the excise officer. The object of fermentation is to convert the malt sugars into alcohol and carbon dioxide gas. Both have a stabilizing influence: carbon dioxide helps to prevent contact with air, and alcohol is a natural preservative. The process begins by 'pitching' or inoculating the liquid with yeast from a previous brew. The whole operation takes about a week and passes through a number of stages. Within a few hours the frothy head on the surface indicates that the yeast has begun to ferment the wort. The fermentation is at its height in two or three days, when the yeasty froth, now resembling cauliflower heads, is skimmed off. During the process, the yeast reproduces itself several times over and when the finest selection has been stored for further brewings, the surplus is sold, reappearing in vegetable soups or as dried yeast, yeast tablets and yeast extracts.

The wort has now been transformed into beer. After a few days' rest, it is run off to a conditioning tank, if it is to be bottled, or racked into casks, if it is to be sold on draught. Beers for bottling undergo a further series of processes—bulk conditioning, possibly chilling, filtration and pasteurization—before delivery to the trade. One advantage of bottling beer is that it has a much better chance of being drunk in the same condition as it left the brewery; draught beer, on the other hand, calls for careful treatment in the public-house cellar where secondary fermentation continues. Cellars vary, and with them the condition and flavour of the draught beer served to the customer. The proportion of bottled beer to draught has risen from barely 5 per cent in 1900 to 25 per cent in 1938 and to 37 per cent in 1954. But in areas dominated by heavy industry, where men acquire vigorous thirsts from the heat of machinery, furnaces, and their own physical exertions, they need a drink that they can take in fair quantities, and bottled beer is inevitably too gassy. So here draught beer still amounts to as much as 85 per cent of the output of local brewers. There are, of course, other reasons to account for the growing preference for bottled beer in the country at large. It has a more brilliant appearance than draught—an important quality now that customers seem to judge beer by the eye

rather than by the palate; it is more expensive and is served in a handsomer glass and so has a higher social status.

The swing in favour of bottled beer, slow as it is, adds to the difficulties of the many small country brewers who depend largely on their sales of draught beer to tied houses and cannot always afford to raise the large sums needed for installing a modern bottling plant. At the other end of the scale, Ind Coope and Allsopp's Burton brewery has the largest and most highly mechanized bottling plant in the country, with a double-shift capacity of a million bottles a day.

Though the public house is still the greatest retail outlet, it must now fight to hold its own. The number of on-licensed houses in England and Wales fell from 99,478 in 1904 to 73,220 in 1953, in spite of the increase in the population from 32 to 43 millions. To put it another way, there are now 16 public houses, instead of 29, per 10,000 of population. Off-licence stores have dwindled only slightly in numbers, from 25,405 to 23,810. In the last few years at least they have probably improved their trade, thanks to the encouragement given by television to drinking at home. Registered clubs now account for 11 per cent of expenditure on alcoholic drinks of all kinds, and no wonder, for their numbers have increased from 6,668 to 21,155. Compared with the pub, hedged in at every turn by a thicket of outworn regulations, the club movement operates with an enviable freedom from official control; and with a combined membership of over 3,000,000, it is well organized to defend its interests. In particular, the largest and liveliest of club organizations, the Working-men's Club and Institute Union, has grown from humble beginnings to a position of almost unchallenged social and political influence.

The reduction in the numbers of public houses has been largely the work of the brewers themselves, in collaboration with the police and the licensing justices. In embarking on this deliberate policy, all three were influenced by the history of the pub in the 19th century. The exemption of beer-houses from justices' control between 1830 and 1870 brought in a huge increase in their numbers and, perhaps not coincidentally, of drunkenness and disorder. The 1830 Beer-house Act established "free trade in ale and ale-houses" in the hope of averting a revival of the gin orgies of Hogarth's day, and of loosening the porter-brewers' grip on the market. It is the most conspicuous illustration of the maxim that you cannot make



tesy of Ind Coope & Allsopp, Ltd

A rotating beer reservoir fills a continuous stream of bottles, then seals them with crown corks, while the operator sits back in comfort. This modern plant can produce a million bottles a day

people sober by Act of Parliament. "The sovereign people", Sydney Smith soon reported, "is in a beastly state"; people were getting drunk, not on gin, but on beer. The victims of the Act retaliated by building the "gin-palaces" which sprang up at least as early as 1833. At first they seem to have been regarded as the harbingers of a new social order. In 1856 George Dodd wrote in *The Food of London*:

The public-houses of London, as distinguished from hotels, inns, chop-houses, eating-houses, and coffee rooms, have undergone great changes within the last few years. They have been transformed from dingy pot-houses into splendid gin-palaces, from painted deal to polished mahogany, from small crooked panes of glass to magnificent crystal sheets, from plain useful fittings to costly luxurious adornments. The old Boniface, with his red nose and his white apron, has made way for the smart damsels who prepare at their toilettes to shine at the bar. The comfortable old landlady is less seen than formerly, ensconced behind and amongst her rich store of cordials and compounds and liqueurs; she, too, must pass under the hands of the milliner before making her daily appearance in public.

No wonder that all these novelties, as Vizetelly recollected many years later, "came as a vision of splendour to the besotted denizens of the neighbouring slums". Societies dedicated to encouraging or enforcing total abstinence redoubled their missionary labours. In *Sketches by Boz*, Dickens was quick to remark that though gin-drinking was a great vice in England, poverty was a greater, and the cause of the first. Until temperance societies could suggest antidotes against hunger and distress, he added, gin-palaces were likely to increase in number and splendour. But already there were other social reformers who thought that public houses need not necessarily be public nuisances. As early as 1878, Norman Shaw designed a pub for middle-class aesthetes which reverted to the style of the village inn: the Tabard at Bedford Park, Middlesex, the first garden suburb. A year earlier, Joseph Chamberlain had attracted much support in Birmingham on proposing an experiment in municipal control; but a resolution to that effect fell flat in the House of Commons. It was not until the nineties that a Public

House Reform Association was founded with Chamberlain himself, the Duke of Westminster, Dr Jayne, Bishop of Chester, Lord Thring and Tom Hughes as its chief sponsors. Then in 1897 a far-sighted brewer, Sir William Waters Butler, worked out a plan for public-house improvement with the chairman of the Birmingham licensing bench, Arthur Chamberlain. Here, as elsewhere, there were far more pubs in the city centre than there was trade to go round, and many of them were in a bad state of repair. More than a thousand licences were extinguished, or exchanged for new licences in the growing suburbs, under the "Fewer and Better" scheme, and so Birmingham was the first city to gain a proper distribution of licences. What was more, the pubs now built in the suburbs were deliberately planned, according to the reformers' prescription, as centres of recreation where drinking was incidental to other forms of entertainment. They were accordingly provided with assembly rooms, restaurants, kitchens, gardens and bowling greens. The government followed the same principle when it acquired all public houses in Carlisle and its hinterland in World War I; and in 1919 the majority of brewing companies embarked on a vast campaign to build new houses and renovate the old. They tore

down old buildings with the whole-hearted conviction that they were substituting the beautiful for the ugly; and if the new houses did not look very much like pubs, that was part of the plan to salve the gin-palace conscience and to attract 'respectable' customers who balked at entering a low public house. The cost was enormous. Between 1918 and 1940 one company alone, Watney Combe Reid, spent £2,800,000 on rebuilding and £1,000,000 on renovation.

"Old men forget; yet all shall be forgot." Comparatively few now remember the period when drunkenness was still a national problem. Already the part that the "improved public house" played in the social revolution has been obscured. The charge against it—at least in aesthetic circles—is that it lacks 'atmosphere'. Many people are more stimulated by having a drink in an "unspoiled country pub" or in a florid urban gin-palace. It is difficult to judge how widely these opinions are held, but if they are strong enough to prevent fine examples of any period from being gutted, that is all to the good.

The restoration, only a few months ago, of the Champion in Wells Street, Marylebone, to its pristine splendour of brilliant cut and acid-etched plate-glass and mirrors, may be

At Watney's Pimlico brewery a long-distance road tanker waits in front of a truck loaded with casks and a wagon with bottled beer for local calls. The industry carries over 10,000,000 tons a year



just a flash in the pan. Elsewhere, at the *fiat* of the local authority, the pubs built in New Towns and new housing estates conform strictly to the 'contemporary' design of surrounding buildings: the best of these are handsome and clean-cut. It is still too early to know how the post-war pub will develop. But two things are fairly certain. The first is that the rise of building costs to 330 per cent above their pre-war level will generally rule out the vast "community centre" pub of the inter-war years. The second is that the pre-war tendency to cut down the number of bars is likely to continue. The new pubs going up have three or even two bars, as the older pubs had before the gin-palace revolutionized urban design. The multiple bar arrangement is melting away with the stratified class prejudices that engendered it. Even the great gulf fixed between the saloon and the public bar has loosened under the disinhibiting impact of the new democracy. And since the changing social functions of the pub are nowhere better illustrated than in the nomenclature of the bars, a tentative dis-

cussion of this obscure subject may perhaps be hazarded.

Originally the village ale-house, ancestor of the pub, had no bars or public rooms. Humbler customers drank in the owner's kitchen; genteeler visitors were accommodated in his private parlour. The "bar" seems to have originated in the bar or hatch separating the kitchen from the taproom or beer store. Though "barre boys" are mentioned by Heywood, c. 1631, "bar-keepers" by Smollett, 1748, and "barmmaids" in *She Stoops to Conquer*, 1773, it seems likely that public rooms were not described as bars until the early years of the 19th century. The plans of public houses reproduced in J. C. Loudon's *Encyclopaedia of Cottage, Farm and Villa Architecture*, 1833, indicate that neither the saloon bar nor the public bar were yet generally known by those names. The kitchen had become a Taproom, Public Parlour or just Bar—hence, no doubt, the modern Public Bar—while the private parlour, thrown open to customers, was called the ParLOUR or the Company Parlour. *Sketches*

A licensee 'tapping' a cask. Secondary fermentation continues until the cask is empty, and must be carefully controlled in the public house cellars if draught beer is to be served at its best

By courtesy of Mitchells & Butlers, Ltd





By courtesy of W. & A. Gilbey Ltd, publishers of The Compleat Imbiber

The "splendour of brilliant cut and acid-etched plate-glass and mirrors": the horse-shoe bar of the Salisbury, St Martin's Lane, a public house that has survived the zeal of reformers who, in their anxiety to promote 'respectability', swept away much that was decorative and picturesque

by Boz, 1836, describes a "modest public house of the old school" as having a "parlour" and a "small bar"; a gin-palace, however, had a long bar counter, "extending the whole width of the place", and beyond was "a lofty and spacious saloon, with a gallery running round it", belonging to the private quarters. The word saloon, used in the 18th century to describe an unusually spacious reception room, may have become applied to the pub via the gin-palace or via the Saloon Theatres, the pub music-halls that flourished in the same decade.

Besides the two basic bars, there might be a Bar Parlour, also called Snuggery or Snug, an inner sanctuary reserved for the landlord's intimates. The Shades, properly located underground, as its classical name implies, survives here and there, though generally superseded by the quite unclassical Dive. Then, with the introduction of the horse-shoe or island counter, new bars were invented. There was the Private Bar, sometimes reserved for women, sometimes for private conversations about business, especially in pubs located near docks, markets and

prisons, where a Ladies' Bar co-existed; the Bottle and Jug, forerunner of the off-licence; the Buffet Bar, for non-alcoholic refreshments, copied from the railway buffet; and in the 20th century, the Saloon Lounge, or just Lounge, an extra refinement on the Saloon, introduced perhaps for the convenience of men accompanied by women. But in the North of England an older nomenclature survives. There the public bar is called the Taproom or the Vaults; the Saloon is the Parlour, the Best End, or the Lounge. Between the two there is often an intermediate bar, taboo to women, which may be called the Taproom (if there are Vaults), the Smoking Room, the Commercial Room, even the News Room, although free newspapers are no longer supplied. There may be a Mixed Bar, indicating that the sexes are officially permitted to mingle, or a Singing Bar, an institution that reaches its finest flower in the mining villages of South Wales.

However much sentimentalists may regret the passing of some of the old pubs, there can be no doubt that the generic pub is a better place than it used to be. The invasion of



(Left) *The Royal Pavilion, Vauxhall Bridge Road, in 1908. Few pubs of this kind remain, for social conscience has demolished them, and replaced them with buildings of a very different character. (Below) The Comet, on the Great North Road near Hatfield, built between the wars, when vast sums were spent on rebuilding and modernization. This was intended to improve the social status of public houses; but a certain traditional atmosphere disappeared in the process. (Opposite) The Crane, Basildon. High building costs have made post-war pubs into something far more like the cosier and less grand buildings of the 18th and early 19th centuries. As did their predecessors, they reflect their age; they have fewer bars and the unpretentious style in which they are designed has been set for them by that of the New Towns*

By courtesy of Watney Combe Reid & Co., Ltd

E. W. Tattersall





Hamlet Court Studios

women has compelled the men to sweeten their manners, and the publican to clean the place up; brewers' greater awareness of their responsibilities, and a more liberal attitude on the part of the justices, have made momentous changes: above all, the improvement of living standards and general behaviour has blown a great clean wind through the licensed trade. It is no longer naughty or vulgar to spend an evening in a pub. The spectacle of a drunken man or woman is no longer a joke, if it ever was. Only social dinosaurs and the stricter Non-conformists think of the local as a drinking den or the Devil's Chapel: the danger now is that it may become *too* respectable. Its customers are a representative cross-section instead of just the raffish and the very poor. There are new faces on the other side of the bar, too; the bull-necked publican, in shirt-sleeves and check waistcoat adorned with massive albert, has yielded to a quieter-spoken type—no less ready, of course, to nip trouble in the bud. He may have been "born into the Trade", descended from generations of licensed victuallers; but it is not uncommon for him to be an ex squadron leader or retired bank manager. Many tenants now go through specialized training courses and are awarded diplomas by written examination.

An institution that has endured so long, and assumed so many costume-changes, obviously caters for a perennial social need. The need is based on the desire to have a drink, but that is not the whole story. Though other countries have places where you drink, the pub has no counterpart. Lucky foreigners see their friends on the boulevard or the piazza; here the climate prescribes an indoor meeting-place. The pub satisfies that need without invading the privacy of the home. Today its doors are open to all sorts and conditions of men, provided only that they know how to behave themselves. You can go into almost any pub now, whether as a neighbour or a stranger, with reasonable certainty that nobody will sell you a dog, sponge a drink, or try to save your soul. Perhaps, after its long history, the pub was finally accepted as a Good Thing in World War II. In the towns it was often the only refuge from the blitz, and in the country the only place where you could get to know the neighbours. And in 1945 the Agent-General for Ontario spoke for Commonwealth and Allied soldiers, and civilians, too: "Our returning boys say 'God bless the English pub! It saved our lives from loneliness. It is a glorious institution, and may it live and prosper for ever'."

How Saskatchewan Dealt with her 'Dust-Bowl'

by ALLAN R. TURNER

Fifty years ago the Province of Saskatchewan, with its sister-Province of Alberta, was carved out of the Northwest Territories of Canada. The following article has been specially written for The Geographical Magazine by Mr Allan Turner of the Saskatchewan Archives as a contribution to the many expressions of proper pride with which the Province's Golden Jubilee is being celebrated

ALMOST a hundred years ago, in 1857, the British government commissioned Captain John Palliser to explore the agricultural possibilities of British North America. In his report on the area Palliser delineated a great "central desert . . . forming a triangle, having for its base the 49th parallel from longitude 100° to 114° W, with its apex reaching to the 52nd parallel of latitude". The lack of trees, the light brown soil, and the short grass covering were the warning evidence upon which he based his conclusions. Subsequent experience in south-western Saskatchewan, which lies within this "Palliser triangle", has shown the area to be subject to recurring drought, although the soil can be productive enough when moisture conditions are favourable.

Earliest settlement in this region was commenced by ranchers, and critics have suggested that the area should have been reserved for grazing. However, the buoyant world-wide economic conditions of the first years of the 20th century brought a great influx of immigrants to western Canada; by the end of the first decade even the marginal lands of this area were quickly taken up. The 'free homestead' policy, under which the Canadian Government granted title to 160 acres of public land to a settler who had paid an entry fee of ten dollars, resided on the land for three years, and brought under cultivation a specified acreage during that time, attracted settlers from eastern Canada, the British Isles and continental Europe. Well-equipped farmers arrived from North Dakota, Montana, and Iowa in the United States to purchase land or to 'homestead'. Of the French-Canadians who came to Saskatchewan from Quebec many found their way into the south-west.

Over the succeeding twenty years a farming economy more or less typical of western Canada was established. Sufficient rainfall in the growing season produced crops of hard

spring wheat which yielded as high as forty bushels to the acre. At each little hamlet along the railway lines which pushed into the region the grain elevators stood sentinel over the landscape, attesting to the productivity of the soil. Hamlets grew into villages and villages into towns. There were some lean years, and the occasional crop failure. While frost, hail, and rust were contributing factors, the principal cause of failure was lack of rainfall. Records of precipitation, including both rain and snow, over many years reveal the precarious basis of this wheat economy. Average annual precipitation at Swift Current during a period of sixty years has been less than fifteen inches, but normally just over one-half of that amount falls in the growing season of April, May, June, and July. The average rainfall in the growing season must be augmented by reserve soil moisture, conserved by methods to which I shall refer later, for a crop of more than fifteen bushels to the acre to be produced. When the precipitation falls below normal, or is not distributed throughout the growing season, poor crops result. In the 1930s successive dry years were experienced; in 1937, precipitation at Swift Current reached a record low of 8.26 inches, with only 2.48 inches in the spring months.

The continued drought, coupled with shrinking markets and depressed prices, reduced the inhabitants almost to destitution. Those who had livestock could not maintain their basic herds for lack of water and feed. Since horse-drawn implements were still used to a considerable extent, motive power became a problem. Horses, grown thin through lack of feed, could not do a full day's work. Harness and horse-collars wore out and could not be replaced. Old machines were patched up in every sort of way in order to keep them functioning at all. To yield adequate returns land must be worked properly even in favourable seasons; ill-worked land yielded nothing in the dry years. Dry

soil, eroded by high winds, filled the roadside ditches, piled up along fences, and formed sand-dunes over clumps of Russian thistle which alone thrived and, cut green, provided some nourishment for livestock. In 1933, and for several years thereafter, hordes of grasshoppers contributed to the wastage of the crops and rendered unpalatable for livestock the green fodder which they did not devour.

As early as 1930 people in the area were forced to accept government relief for food, clothing, and fuel. Assistance in the form of seed grain and fodder, tractor fuel, and implement repairs became necessary to continue farming operations. Voluntary relief agencies, church groups, and various associations in less severely affected parts of Saskatchewan and elsewhere in Canada augmented the public assistance by shipping in carloads of clothing, bedding, fruit and vegetables. Numerous families drifted out of the area but many with a continuing faith in the eventual return of better conditions remained. Some stayed simply because there was no place to go where they felt they might better their lot.

Meanwhile the brains of Canada had not been idle. The connected problems of conserving soil moisture and preventing wind

erosion of dry soil were studied at Dominion Government experimental stations, with special reference to two traditional practices: that of burning off the stubble of the old crop and that of 'summer-fallowing' the land one year so as to allow sufficient moisture to accumulate in the soil for an economic crop to be produced the next year. Large areas of bare, fallow land were found to be an invitation to wind erosion. It was learned that, while a 15 m.p.h. wind would transport particles of soil from an exposed surface, a six-inch stubble in a field would reduce the wind velocity to such an extent that the soil no longer moved. It was also discovered that the lifting effect of a wind is related to convectional eddies which, owing to the absorption of the sun's rays, are greatest over areas of 'black fallow'; and that the maximum intensity of erosion for a given wind is not reached until distances, varying in relation to the nature of the ground from several feet up to 500 yards, are travelled from the windward edge of the exposed area.

Applying these findings, new methods of tillage and cropping were perfected. The practice of burning off old stubble was discontinued; instead, 'trash-cover' farming was developed, which meant that the stubble was

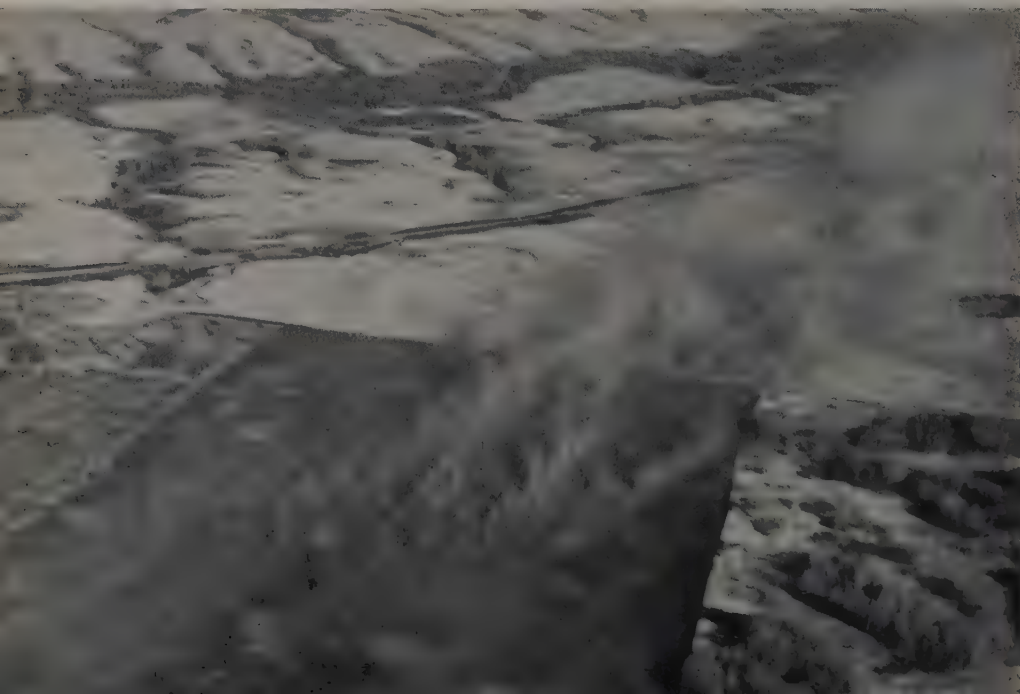


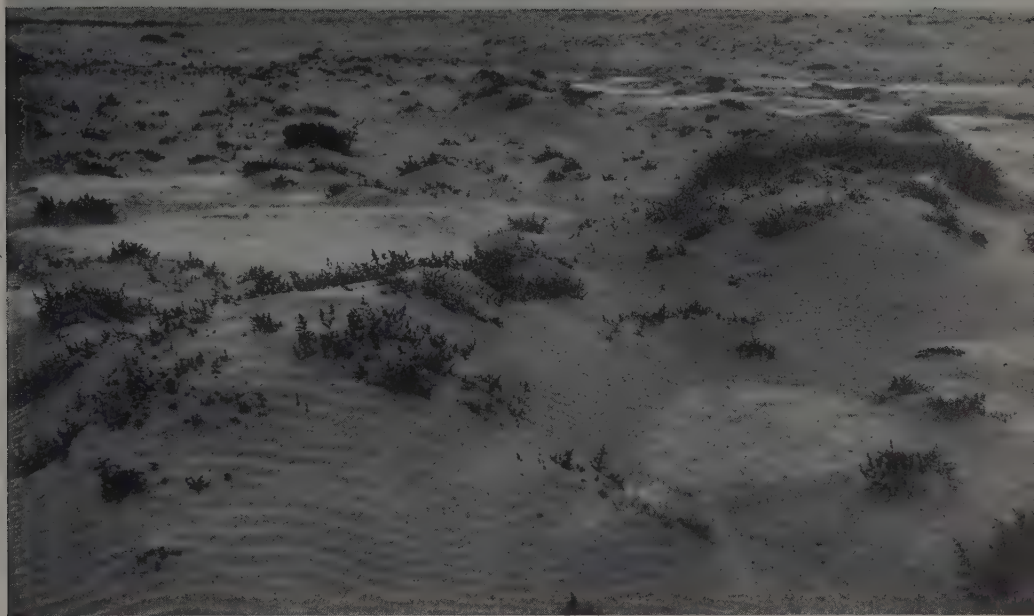


Photographs from the Prairie Farm Rehabilitation Administration

(Above) For thirty years of this century the wheat-growing economy of the Canadian prairies thrived in south-western Saskatchewan but uncertain rainfall made it precarious: a few dry years brought ruin.

(Below) Wind erosion destroying fallow land. Most soil is picked up well away from the windward edge





(Above) In the drought of the 1930s wind-storms left little but dunes of loose soil and clumps of Russian thistle in their path. (Below) Farmers are now encouraged to grow crops in strips at right angles to the prevailing wind to prevent it from driving freely across open fields of bare black fallow





(Above) 'Trash-cover' farming is a safeguard against wind erosion. Stubble left on the surface protects it while the soil beneath is cultivated with special implements. (Below) Crested wheat grass with long roots has restored fibre to exposed prairie soil and affords pasturage for cattle



left firmly anchored in the soil while the ground beneath was cultivated, special implements being devised to carry out this new sub-surface operation. In addition, farmers were encouraged to grow their crops in strips, lying crosswise to the path of prevailing winds, so that cooler strips of crop or stubble, alternating with bare fallow, might reduce the lifting power of the wind. Furthermore, large areas were seeded with deep-rooted drought-resistant crested wheat grass in order to restore fibre to exposed soil and provide pasture. These techniques were widely adopted throughout south-western Saskatchewan and southern Alberta.

Such measures, however, could not compensate for a lack of rainfall in the growing season, and the problem of providing water for livestock remained. What was needed was an agency with the authority and funds necessary to undertake a water-conservation and development programme. In 1935 the Canadian Parliament passed the Prairie Farm Rehabilitation Act which provided for expenditure of public funds for the rehabilitation of areas affected by drought and drifting soil in the Prairie Provinces. Specific provision was added in 1937 for the withdrawal of poor-quality lands from cultivation and the resettlement of farmers working on them.

In south-western Saskatchewan the Prairie Farm Rehabilitation Administration (P.F.R.A.) set up to carry out the provisions of this Act has inaugurated many 'projects', with great beneficial effect; and the physical results of the P.F.R.A. programme are readily apparent to the visitor to the area. After leaving the trans-Canada highway at Swift Current, the summer motorist follows a narrow ribbon of gravelled highway some seventy miles toward the southern skyline until he comes upon a deep cut in the surface of the land, typical of the narrow river-valleys of the western plains. This is the valley of the Frenchman River which rises in the Cypress Hills, near the Alberta boundary, and channels its way in a south-easterly direction across the corner of Saskatchewan into Montana. A large rectangular painted sign on the right announces the headquarters of the P.F.R.A. West Val Marie project. From here a side road winds among the curiously eroded hills to a promontory below which stretches the panorama of the valley floor. Far up the valley is the West Val Marie dam and below it running through green fields the narrow winding river, with irrigation canals emanating from it. Occasional clusters of farm buildings dot the landscape, and here and there are long stacks of

baled hay. Cattle graze on the grass-covered hills and in the ravines running into the valley. The river continues its way into another man-made lake, the Val Marie dam, hidden in the twisting valley like the village of Val Marie beyond it.

Descending into the valley the visitor comes upon men working in the fields. Representative of them is a short, wiry, deeply tanned man cutting hay with a tractor and mower. He is Orphil Legault, a bilingual French-Canadian. His father came to Val Marie in 1912; the family followed in 1914, Orphil, a boy of eight, among them. Pioneer life involved hardships for the Legault family. Orphil recalls that supplies had to be hauled over thirty miles from Ponteix, then the nearest point on the railway. When he grew up, he went into mixed farming, only to encounter the same conditions of recurring drought which other settlers in the area experienced. The worst year came in 1937 when there was a total crop failure and he had to reduce his herd of cattle to three head. Now he has been re-established on the West Val Marie irrigation project, one of two associated with the respective dams.

Construction of the Val Marie dam was completed by P.F.R.A. in 1937 at a cost of over \$214,000. It has a storage capacity of 7000 acre feet of water (i.e. enough water to cover 7000 acres to a depth of one foot) and serves an irrigable area of 5500 acres. A further expenditure of \$150,000 went into the West Val Marie project, completed in 1940. At capacity, the earth wall holds back 2000 acre feet of water, and below it 3500 acres can be irrigated by combined gravity flow and pumping. As a relief measure farmers of the district were employed in constructing the dams, clearing the sagebrush and greasewood which were the native vegetation in the valley, breaking and levelling the land, and installing irrigation structures and ditches. Land in the area of the project was purchased from owners at the prevailing prices for dry (unirrigated) land while those lands with title vested in the Crown were transferred by the government of Saskatchewan to P.F.R.A. After gaining experience in farming irrigated land, farmers were offered agreements of sale, with payments spread over a fourteen-year period. The remainder of the land is leased to farmers at an annual rental per acre.

Orphil Legault has leased land at West Val Marie since 1941. In 1954 he had ninety acres seeded to grass forage crop and about fifty acres of oats. The grass crop, a mixture of alfalfa and brome grass, with some crested



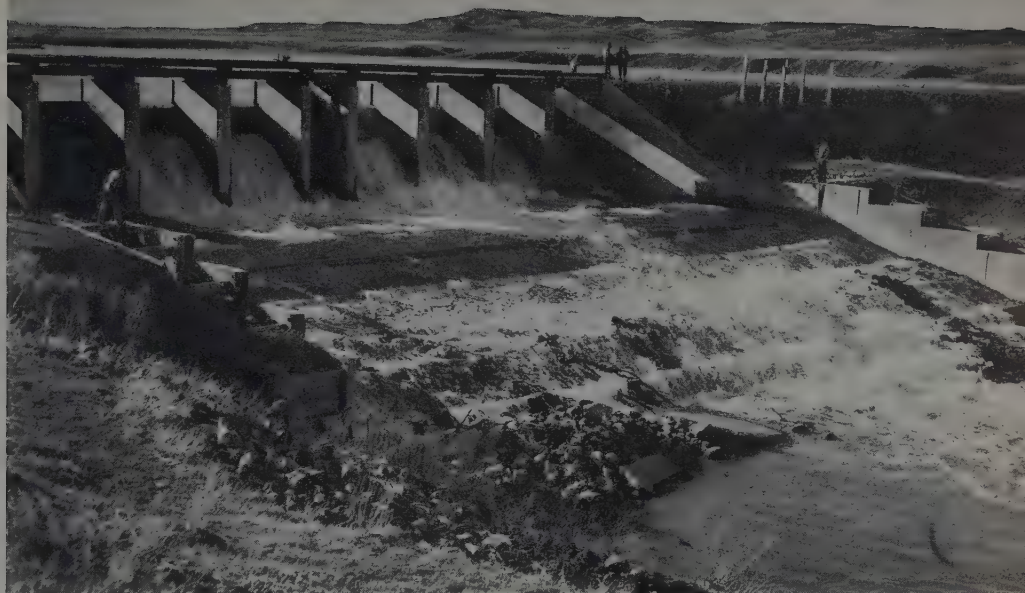
Snow accumulated in valleys of the Cypress Hills provides much of the water for the irrigation 'projects' of the Prairie Farm Rehabilitation Administration in south-western Saskatchewan, with dams for water storage on the Frenchman River and the Battle, Maple and Swift Current creeks

wheat grass and clover, yielded an average of two tons per acre from the first cutting, and one ton from the second cutting. Legault, like other farmers on the project, owns his own tractor, mower, and hay baler. The fodder which he raises enables him to winter an average of two hundred head of cattle, although, counting calves, his mixed herd of white-faced Herefords and black Aberdeen Angus cattle numbered almost 300 in the fall of 1954. In the winter Legault feeds his cattle in the open and they find shelter along the willow-lined banks of the river. He keeps a few horses for hauling feed and other winter operations and a saddle-pony for rounding up the cattle.

The village of Val Marie is about fifteen miles distant from the West Val Marie project and here the nearest school, church, post office, stores and entertainments are found. The Legault family, consisting of Mrs Legault and one son, live on the farm during the summer; but because of periods of sub-zero temperatures and heavy snow which may block the roads, Mrs Legault lives in Val Marie during the winter in order that their son may attend school regularly. While other families on the West project make arrangements similar to the Legault family, many

reside the year round on the Val Marie project which lies closer to the village.

During the summer Legault's cattle are run in the Val Marie 'community pasture'. This is a unit in a vast programme of pasture reclamation conducted by P.F.R.A., designed to 'regress' derelict farmlands and improve their stock-carrying capacity. Some idea of its magnitude may be gained from the statement that by 1954 fifty-four community pastures, enclosing 1,519,356 acres, had been established by P.F.R.A. in Saskatchewan and in that year 90,000 cattle and 2300 horses were pastured on them. Each pasture is supervised by a P.F.R.A. pasture manager, while grazing is allocated by an advisory committee appointed by the patrons. The pasture management policy is designed to maintain a reserve of grass to meet a recurrence of drought conditions. A fee averaging about 75 cents per month is charged for each head of cattle recorded for pasturage, and other services, such as breeding, spraying, vaccination against prevalent diseases, and de-horning are provided at nominal rates. The patrons can improve the quality of their stock through pure-bred bulls brought in by P.F.R.A.; and they also get the benefit of current research on new grasses.

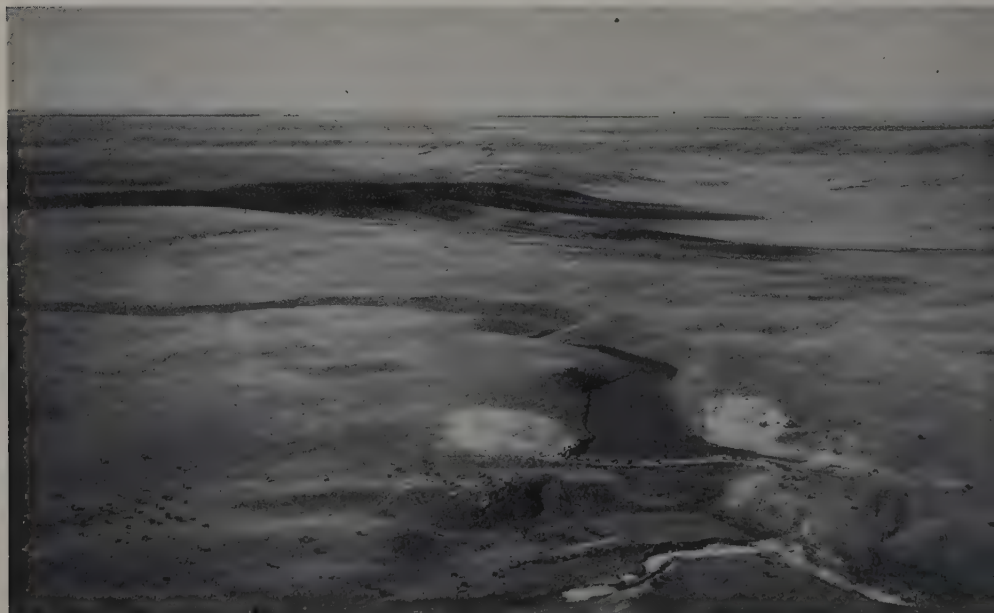


(Above) The spillway of the West Val Marie dam on the Frenchman River which, with a companion dam, serves irrigable areas totalling 9000 acres. (Below) 'Contour' irrigation ditches on the Val Marie project. While, as here, oats are a valuable cash-crop, these irrigated lands mainly produce fodder





(Above) Cattle being fed in winter at Val Marie. "Farmers on these projects have benefited materially by the change from wheat-growing to a livestock economy"; the irrigated land assures winter feed, the 'community pasture' summer grazing. (Below) A stock-watering dam on a community pasture



The Val Marie community pasture encloses 155,680 acres around the irrigation project. Over 4000 cattle are now pastured in it, contrasting with an estimated total of 150 head left in the whole Val Marie district in 1937.

Farmers on these projects have benefited materially by the change from wheat-growing to a livestock economy. They are assured of winter feed from the irrigated land and summer grazing in the community pasture. Some of the farmers on the Val Marie project now irrigate wheat which, along with oats and surplus hay, provides a cash-crop. Owing, however, to the nature of the soil, wheat yields on the irrigated land are not appreciably higher than those obtained under optimum conditions on dry land; and the farmers therefore tend to concentrate mainly on fodder-crops. Indirect benefits have accrued to the village of Val Marie which has purchased its own pump to supply water from the irrigation system for the gardens of its residents. The more stable farm income benefits all local businesses. In addition, the pay-roll of the P.F.R.A. staff is spent locally. This staff, which numbered over twenty men in 1954, renders assistance and advice to farmers and is responsible for maintenance

of the whole system and irrigating operations. Downstream from Val Marie, where the Frenchman River frequently became a mere trickle or went dry in summer, the regulated flow now provides water for livestock along the 100-mile stretch of the river. Upstream, at Eastend, another P.F.R.A. dam, which was completed in 1939 and from which 4000 acres can be irrigated, provides benefits similar to the Val Marie project.

Basic to the whole system is the provision of a water storage basin at the source of the Frenchman River. The Cypress Hills, which extend almost a hundred miles across the Alberta-Saskatchewan border, rise from 1000 to 1500 feet above the surrounding country. This elevation produces a rainfall averaging twenty-one inches annually, resulting in a heavy run-off, especially in the spring when the snow melts. By use of natural water-courses and diversion canals the water is channelled into Cypress Lake where P.F.R.A. has built two dams, one at the eastern outlet of the lake into the Frenchman River, and the other at the western end to prevent overflow southwards into Battle Creek, thereby creating a reservoir which can store 80,000 acre feet of water. From it water can be

In Saskatchewan alone the P.F.R.A. has established community pastures enclosing over 1,500,000 acres. The management of each pasture supplies many services at nominal rates: pure-bred bulls, vaccination against prevalent diseases, de-horning and spraying to counteract infestation by flies





A prairie farm in Saskatchewan with a 'dugout' reservoir close to the buildings. The P.F.R.A. has advanced capital to farmers in the Province for the construction of over 27,000 such dugouts

released into the Frenchman River to replenish the supply in the dams at Eastend and Val Marie, and also into both rivers to maintain their flow. Water from Battle Creek is diverted to irrigate the Richardson-McKinnon and Nashlyn projects in the extreme south-west of the Province. Just to the north of the Cypress Hills near Maple Creek some 2600 acres are now irrigated.

Still another irrigation system using water from this source is under development. At Duncairn on the Swift Current creek, which rises in the Cypress Hills, a 66-foot-high earth-filled dam has been constructed. Water from it stabilizes the supply for the city of Swift Current and is led by canal to a narrow strip of low-lying land, stretching approximately forty miles from Swift Current to Herbert. Auxiliary reservoirs at Lac Pelletier and Highfield contribute to the water supply for this project which will irrigate 30,000 acres. By 1954, a total of 571 farmers had been resettled on these irrigation projects in south-western Saskatchewan, while the lands from which they were moved had been regressed and incorporated in community pastures.

Some 200 irrigation and stock-watering projects on a scale similar to these undertakings in the south-west have been constructed throughout Saskatchewan. In addition,

P.F.R.A. has provided engineering services and financial assistance to a tremendous number of projects on individual farms. By 1954, these totalled 1863 small irrigation schemes, 3933 stock-watering dams, and 27,698 'dugouts'. The typical farm dugout, excavated by horse-drawn, tractor-drawn, or heavy earth-moving equipment, measures about 160 feet in length by sixty feet in width, with a depth of ten or twelve feet. Since a drainage area of thirty to fifty acres will fill such a reservoir, it can be located close to farm buildings, garden, or pasture, depending on the intended use of the water supply for household purposes, small garden irrigation, or stock-watering.

Saskatchewan in 1955 observes the Golden Jubilee of its status as a Province of Canada. Looking back over the fifty years, the decade of drought and depression of the 1930s stands out at first as a period of stagnation and despair. However, through the perseverance of the people and the experimentation and construction which went into the solution of the problems of that period, something of lasting benefit has been produced: a truly impressive achievement in water-conservation and improved land-usage which has done much to build up a more balanced and stable agricultural economy.

Bolivia's New Path

by HAROLD OSBORNE

Mr Osborne was First Secretary (Commercial) at the British Embassy, La Paz, from 1947 to 1951 and during that time travelled extensively in Bolivia. After returning to England he published Indians of the Andes in The International Library of Sociology and Social Reconstruction (Routledge and Kegan Paul) and Bolivia A Land Divided (Royal Institute of International Affairs)

BOLIVIA has been named "the Switzerland of South America" and is often pictured as a land-locked, mountainous republic, where about a fifth of the world's tin is mined amongst the solitary fastnesses of the Andes. If it were restricted to western Bolivia, such a description would not be inapt. And it is here, on the bleak and sterile Altiplano, a freak plateau enclosed at 13,000 feet above sea level by encircling chains of the Andes, that the economic life of the nation has been traditionally concentrated to such a degree that Bolivians themselves have too often forgotten that this is not the whole of their country.

In fact seven-tenths of Bolivian territory extends to the east of the central Cordillera and is occupied by tropical forests and savannahs which lie at little above sea level within the drainage basins of the Amazon and the River Plate. These eastern territories, known as the Oriente, are rich beyond reckoning in unexploited and mainly unexplored natural resources. In the north there are vast tracts of primeval forest: a United Nations mission in 1951 estimated with only slight exaggeration that Bolivia's share of Amazonian forest covers an area of some 200,000 square miles. They have in the past been tapped for natural rubber, quinine and Brazil nut; but with changing conditions of demand these industries are now in decline. Together with the eastern forests near the Brazilian border—made familiar to many by Julian Duguid's *Green Hell*—and the lower, drier forests in the south, which are still rich in quebracho, walnut and tabajo, they constitute one of the world's most important reserves of tropical timber. In the central plains of the Beni it has been estimated that between 1,000,000 and 1,500,000 head of cattle range wild and untended, subject to the nominal ownership of a few great *rancheros*. Further south the Department of Santa Cruz, which at the turn of the century produced a small surplus of sugar for export, besides important oil-fields is fertile for the production of rice, maize, mandioca, tropical

wheat, cotton, oil-bearing plants and every variety of tropical fruits.

For the past two centuries these low-lying eastern territories have been subjected to spoliation and neglect. Cut off from the western area by the almost impenetrable barrier of the Cordillera, they are underdeveloped, underpopulated and derelict. The soil of the northern plains is being soured by annual inundations caused by the unchecked silting up of the river beds and the quality of the pasturage is deteriorating. The south suffers from drought and extensive irrigation is now required to restore it to fruitfulness.

The two great obstacles to a revival of the Oriente are its lack of population and its physical isolation. The once flourishing native peoples have been all but eliminated and the white settlers are pitifully inadequate to the needs of development. In the Santa Cruz region the density of population is given as 2.8 per square mile, while in the Beni and Pando it is only 0.77 per square mile. If you discount the few languishing urban centres, the general distribution is very much below this. There are immense stretches entirely devoid of human occupation, hundreds upon hundreds of square miles given up solely to the roaming cattle or occasionally penetrated by the now much rarer nomadic Indian tribes. Many of the rivers are navigable and I have travelled up and down long stretches of the Mamoré and the Beni: fifteen hundred miles of waterways leading from nowhere to nowhere, or only to such places as the old trading town of Riberalta, magnificently situated on high ground overlooking the sweep of the Beni at its junction with the Madre de Dios and eternally waiting for trade that no more comes.

In all this great area the rivers wind on monotonously through desolate, uninhabited, unworked country where the lush rankness of tropical vegetation blots out every sign of human intervention from one season to the next. For days on end the only human contact one is likely to make is with an occasional

lancha of intrepid caiman-hunters—and yet these rivers are the highways and main thoroughfares of the region. The Oriente is seamed with great watercourses which provide a means of transport from one end to the other but nowhere lead out to the highlands of the west. The great majority of merchandise which enters and leaves must still be carried by air. It has always been Bolivia's problem and despair to discover a commercially viable route between the Altiplano and the Oriente, a route which would integrate a country divided by Nature.

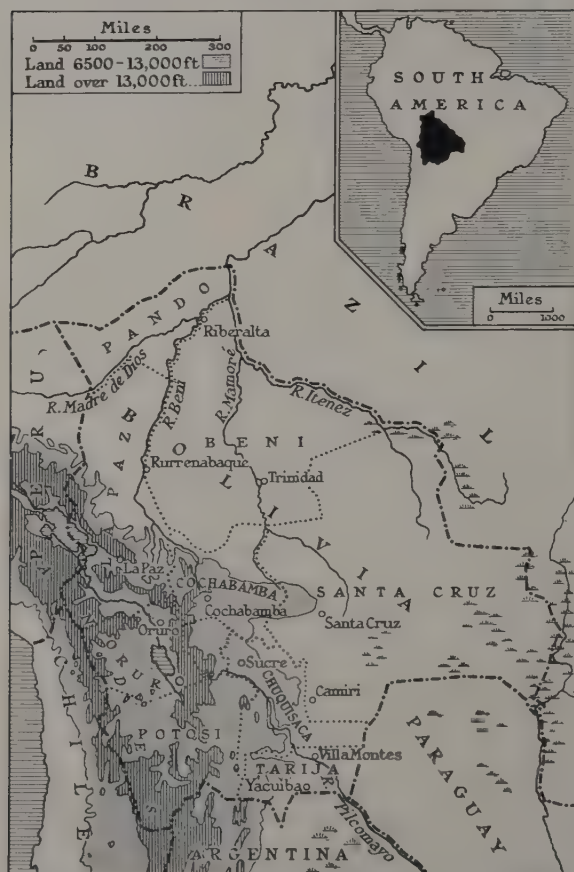
Although the great majority of Bolivia's population is concentrated in the northern half of the Altiplano, it is easy to exaggerate the density even there. Compared with the normal European countryside it is still a desert. One may drive over its arid surface

the whole day long with barely an occasional cluster of squalid adobe huts to break the grandiose solitude of greying *ichu* grass and snow-capped peaks on the horizon. Despite successive cessions of territory by which it has been reduced to less than half its original area, Bolivia is still as large as France and Spain combined. Its total population of something over 3,000,000 is roughly equal to the population of Buenos Aires.

Of this population over fifty per cent are Indians and over thirty per cent are *cholos*, that is of mixed Indian and Spanish blood. The Altiplano Indians are descendants of those Aymara-speaking and Quechua-speaking peoples who formed the backbone of the old empire of the Incas. They are a hardy, dour, toiling, patient race, farmers and miners by preference and tradition, conservative in

their outlook and distrustful of change. Highlanders by instinct, they are fanatically attached to the unprofitable soil of the Altiplano and will hardly be driven from it by famine or expropriation or lured by the incentive of easier conditions elsewhere. The *cholos*, who have grown up as a middle class between the Indians and the ruling white minority, are more vivacious, more ambitious and more enterprising, but also more fickle and more unstable than the Indian. Lacking the inherent sense of social responsibility which is found in a European peasantry, they are good material still to be fashioned. With them the future of the country rests.

As happens when a country is controlled by a small minority in its own interests, Bolivia has always been a land of extremes. In La Paz you might see sleek American cars cheek by jowl with troops of llamas driven by thin-faced Indian children; in one street modern office buildings and in the next decrepit adobe shacks and the street markets of the Indians. The middle classes habitually overate while the Indian was chronically under-nourished on a handful of maize and quinoa, the indigenous cereal



A. J. Thornton



All photographs, except two, by Al

Economic recovery is pledged by Bolivia's Nationalist Government. This was the theme of the address delivered by the President (Dr Victor Paz Estenssoro) from the Palacio de Gobierno in the Plaza Murillo of La Paz on the second anniversary of the revolution which brought his party into power

The Spanish Conquest introduced oxen, sheep and the plough to the Andean Indians. But methods of agriculture on the Altiplano have remained rudimentary and the arid and stony soil offers little scope for intensified production. This was the original home of the potato; its main crops are still potatoes and quinoa (a local food-grain) and not much else





The Nationalist Government of Bolivia was carried to power on the support of the Indian miners and farmers and was committed to their emancipation. Its Agrarian Reform Decree of August 1953 provided for the redistribution of land to the Indians, who had been dispossessed through centuries of oppression. Here, outside the new Ministry of Rural Affairs, Indians display the title-deeds to their holdings. They have always been closely attached to the land and this measure redounded greatly to the popularity of the Government. Yet the plans for economic recovery can only be realized in the fertile but under-populated eastern territories and demand a massive movement of workers away from the highlands to them

The first measure of economic reform undertaken after the revolution of 1952 was the nationalization of the large mining enterprises. The Corporación Minera de Bolivia, set up to manage the confiscated properties of Patiño, Hochschild and Aramayo, became overnight one of the largest mining concerns in the world. The need for subsidizing the mining industry has tended to aggravate the inflation of recent years





Harold Os

Most of Bolivia's mineral deposits are situated at great altitudes in inaccessible regions of the Cordillera and production costs are therefore unusually heavy. This small mining encampment is "La Union", one of the three owned by Fabulosa Mines, the only British mining company operating in Bolivia



Courtesy of Thompson-Cornwall, Inc., New York

The motor road between Cochabamba and Santa Cruz, opened last year, provides the commercial link which for centuries Bolivia has lacked between the highlands and the low-lying tropical territories of the south-east. It is an essential factor in the present programme of Economic Diversification

of the high plateau. Until recently every imported luxury was available in the shops for the wealthy while the Indian owned nothing but what he made for himself. My own small house in La Paz was equipped with the most up-to-date American water-heater; my Aymara gardener expected to mow the lawn with the ragged edge of a sardine tin. And despite its great potential resources Bolivia was officially classed as a backward country—a "beggar sitting upon a chair of gold," as Bolivians said of themselves.

This is the situation which the Nationalist Government was pledged to rectify and this is the material with which it had to work. The Nationalist Government came to office in April 1952 by armed revolution. It was carried to power by the leaders of the workers' unions and by the organized Indian mine labour, which by its defeat of the militia destroyed the latter as a political force in the country. And it has been retained in office by the continued support of Indian labour. It came committed to the nationalization of the mines, to alleviate the lot of the underprivileged and to restore the land to those who work the land. Through financial emergency and the constant threat of economic collapse it has pursued these ends with a mixture of genuine idealism, political opportunism and hard-headed realism.

As is not infrequently the case in countries whose natural resources have been developed with the aid of capital from abroad, resentment against 'exploitation' by the foreigner was fanned into a political war-cry and the nationalization of the three large mining companies, Patiño, Hochschild and Aramayo, which together produced three-quarters of Bolivia's mineral output, was accomplished in October 1952 amidst immense popular enthusiasm. A public corporation, the *Corporación Minera de Bolivia*, was created to manage the expropriated properties and without experience of production or marketing technique became overnight one of the largest mining concerns in the world. To judge by the export figures for 1954 the level of production in the mines has not been maintained; and in his address to the people in April 1955, on the anniversary of the revolution, the President announced that since the credit financing of the industry had been a main cause of the exaggerated inflation from which the country has suffered, it would be necessary to contract foreign experts to reorganize the *Corporación*. The labour leaders have meanwhile been vociferous for a more radical programme of nationalization on quasi-Soviet models, while the President,

an economic realist, has opposed them with the slogan that any further nationalization would mean only "the nationalization of poverty and wretchedness".

Financially, Bolivia has long suffered all the inconveniences of an economic system dependent on a single type of product, which in the last twenty years have been aggravated by the faulty and shortsighted policies of previous administrations. Exports of non-ferrous metals—produced by some 50,000 or 60,000 Indian workers—have accounted for 95 per cent of the country's earnings of foreign exchange, and tin has accounted for some three-quarters of this; a precarious state of affairs, which has been made still more so by the action of previous administrations in subsidizing imports of foodstuffs, raw materials and consumer goods through indirect taxation of the mining industry. Unable to compete with artificially cheapened imports, and hampered too by the difficulties of internal transport, the small local productions that there were have languished and died. When I travelled through the Santa Cruz region and the Beni, we took with us imported sugar while the local sugar was used for the manufacture of alcohol or fed to the cattle as molasses. Peruvian petrol was cheaper at Riberalta than petrol from Camiri in the south of Bolivia. Argentine meat was cheaper in La Paz than meat flown up from Trinidad, less than half as far away as the Argentine border. Timber from Canada cost less than timber flown up from Rurrenabaque on the river Beni. Rice, wheat, cotton, wool, sugar, coffee, tobacco and vegetable oils were all being imported in increasing quantities while local production was starved and dwindled. Thus as the country came to rely more and more on importing commodities which had formerly been produced at home, its need for foreign exchange correspondingly grew and it became more and more vulnerable to changes in the world prices of non-ferrous metals. Outside observers predicted an inevitable collapse.

The crisis came in 1953 and found the Nationalist Government unprepared. It was caused by an abrupt fall in the world price of tin and consequent reduction in the foreign exchange income at a time when the Government had undertaken heavy commitments for social reform and had also become itself responsible for the bulk of the mining industry. During most of 1953 tin was being produced at a cost above the market price and the heavy subsidies necessary to keep the industry in operation aggravated the runaway inflation which had for many years

been characteristic of Bolivian finance. In May 1953 heroic measures were adopted. Imports were radically restricted, even to the point of starving local manufactures. Retail prices were frozen, wages were fixed, and the Boliviano was devalued from 42 to the dollar to 190. But these measures had only very limited success and without timely American assistance economic disaster would have ensued, bringing widespread starvation and certain bloodshed. In 1954 American aid in finance and in necessary food-stuffs totalled \$12,500,000 and in January 1955 a sum of \$18,000,000 was announced for the current fiscal year. Yet the inflationary trend has not been checked. According to the official statistics the cost of living rose by 404 per cent between December 1952 and December 1954, while wages in the same period increased only by about 120 per cent. A further general consolidated wage increase of up to 75 per cent was decreed in March 1955. Thus although the social measures of the Government have done much to close the gap between the privileged and the underprivileged, it has been rather at the expense of a general depreciation of the living standard for all than an absolute improvement in the conditions of the workers.

Parallel to these emergency and palliative measures there has been a fixed determination—inspired primarily by the President himself—to reverse the economic tendency which brought the country to the verge of disaster. A programme of Economic Diversification was drawn up and handed to Dr Milton Eisenhower (brother of the President of the United States), when he visited the country in July 1953; and an amplified version of it was issued by the Ministry of Foreign Affairs in December 1954. The idea of Economic Diversification is simple. It consists in the revival of home production and the recovery of a degree of self-sufficiency which will reduce the country's import requirements within the scope of the foreign exchange that it can earn by its exports of minerals. But the difficulties are colossal. It is necessary on the one hand to bring to life the latent possibilities of the Oriente and to intensify cultivation in the high valleys of Cochabamba, Chuquisaca and Tarija. On the other hand, in order to reap the benefit of this, the problem of communications must be solved.

The Government's programme gives high priority to the building of new roads. After ten years of difficulty and frustration the motor road between Cochabamba and Santa

Cruz was completed in 1954 and at last provides a link between the southern portion of the Oriente and the highland plateau. It has been described as "the most important road ever built in South America"; its importance for the economic unification of Bolivia at any rate can hardly be exaggerated. Without it the present plans could not seriously have been conceived; because of it practical steps have already been possible to rescue Santa Cruz from the lethargy into which it had sunk. A start was made with the revival of the sugar industry. A large sugar-factory is under construction at Guabira, thirty miles north of the town of Santa Cruz, and is expected to be completed this year. There are stated to be good prospects that Bolivia will shortly be self-supporting in sugar. Combined with projects for extensive irrigation of the Villa Montes area, utilizing the waters of the River Pilcomayo, a beginning has been made of the serious cultivation of cotton to supply the cotton factories of La Paz. Both in Santa Cruz and in the high valleys the cultivation of rice, wheat, maize, coffee, tobacco and oil-plants is being stimulated.

There is, however, an intimate connection between the programme of Economic Diversification and the policy of Agrarian Reform. It is generally admitted that the conditions of land tenure have formed one of the darkest blots on Bolivian history and have been in some measure responsible for the progressive decline of agriculture on the Altiplano. From the earliest days of the Conquest and throughout the Colonial period the Indians have been expropriated from the land that was theirs, driven to subsist at starvation level on the most unfertile tracts of the unfertile Altiplano or forced to labour in conditions of serfdom on the estates of those who had robbed them. The same process of injustice and exploitation persisted under the Republic. The Nationalist Government came to office pledged to restore the land to those who work it and in August 1953, in spite of the calamitous condition of national finances and the critical need for a maximum of home production, a decree was passed whose effect was to limit the size of estates and to grant powers for the redistribution of land to smallholders. There is no reason to doubt that this agrarian reform was motivated by genuine idealism, by the desire to right the wrongs of the past and to integrate the Indian populace more closely into the fabric of the state. It was also a particularly astute political move. Every highland Indian is at heart a farmer and his most cherished desire is to own the



All photographs by the author

(Above) Shallow-draught launches, towing barges, navigate the many hundred miles of rivers with which Bolivia's Oriente is seamed. (Below) At Cachuela Esperanza, north-east of Riberalta on the River Beni, is the headquarters of the rubber firm of Suárez Hermanos. Here the rubber is transported in balls by an antiquated steam-engine past the rapids and then shipped down the Amazon to the Atlantic





The oil-wells of Camiri are situated among low hills at the edge of the vast forests which extend eastwards to the Brazilian frontier. The unprecedented boom in output during 1954 contributed to the salvation of Bolivia's shaky economy and petroleum is already being exported to neighbouring countries

land he works. Nothing could conduce better to secure the position of a Government which depends upon Indian support than the popularity of this measure.

The consequences of the reform are another matter and one very difficult to predict. A temporary decline in production is always expected to follow the redistribution of land, but whether it will in this case be compensated for by the additional enthusiasm of the new holders remains to be seen. Psychologically the Indian farmer of Bolivia is averse from producing agricultural surpluses. He makes for himself everything he has: his house, his clothes, his furniture, his implements. Being thus self-sufficient, he plans his operations within the limits of his own needs and those of his immediate family. He has little sense of social responsibility outside the Indian commune and is not open to the usual incentives which operate through the monetary economy of a modern state. There is a real danger that once the first flush of enthusiasm has waned the reform will result in a serious diminution of output.

But even if the most optimistic expectations are realized and output increases rather than decreases, this can contribute nothing to the programme of Economic Diversification which is so essential to put Bolivian economy on its feet again. The staple crops of the Altiplano are potatoes, quinoa and a little barley. It is not tolerant of the crops which are needed in greater abundance in order to reduce Bolivia's import requirements. These, as I have said, can only result from increased exploitation not of the Altiplano but of the high valleys of Cochabamba, Chuquisaca and Tarija—and particularly of the Oriente. Exploitation is impossible without population and vast unpopulated areas cannot be brought to life without an influx of agricultural workers from outside. The only reservoir of population which the Government has to draw on is the Indians of the Altiplano; and at the same time as it is restoring to them their title to the land there it has instituted an intensive propaganda campaign among them in the attempt to induce them to migrate eastwards and take up land in the empty development areas. But the Altiplano Indians are not only essentially a highland race, they are rooted to the Altiplano itself. Even under threat of famine and the most ruthless persecution they have never in the past spontaneously abandoned their beloved highlands for more tempting and fertile lands at lower altitudes in the east. When they have been trans-

planted under Government colonization schemes, they have hitherto proved even less adaptable than Europeans to the climatic conditions and the agricultural demands of the Oriente. This, then, may well prove the rock upon which the present projects of economic diversification will founder. Those projects demand that people be moved to where new labour is needed and the only available population shows little signs of adaptability. At the very least the policy of Agrarian Reform which makes the Indian lord of his domain on the Altiplano can only work counter to the crying need to transfer him elsewhere.

If the main programme of Economic Diversification is necessarily agricultural and its achievements in this respect are bound to be slow, one spectacular success can already be registered, namely, a phenomenal jump in the petroleum output. When I visited the main oil centres of Camiri and Sanandita just at the time when the pipeline to the refineries at Sucre and Cochabamba was coming into operation—some two years before the present Government came to power—I was impressed by the efficiency and the energy which I saw there. But finance for necessary development was grudging and production dropped from 108,000 cubic metres in 1949 to 83,000 in 1951 and 1952. Despite the bankruptcy of its finances the Nationalist Government went ahead with new investments in 1953 and was more than justified by a production of 269,000 cubic metres in 1954. Nothing has done more to improve Bolivia's economic stock than this petroleum boom and if it is maintained, Bolivia can expect to become a steady exporter of petrol on a small scale. A pipeline from the oilfields to northern Argentina at Yacuiba is almost completed and plans have been drawn up for continuing the Cochabamba pipeline across the Altiplano to Oruro and La Paz and thence down to the Pacific coast.

So far no other startling results of the new programme have been declared, nor were they to be expected, and for the time being one can only say that the steps that are being taken are all in the right direction. If the difficulties of finance, of physical communications and of population can be overcome and if new life can be brought to the Oriente, there is no reason why Bolivia should not become virtually self-supporting in most basic essentials and with the continuation of her valuable mineral exports regain a prosperity which the country has not known for centuries.

Lebanon Background

Notes by R. W. HIGHWOOD



Photographs by Emil Brunner, from B.I.P.S.

Lebanon, of which Beirut is the capital, attained its independence in 1941, after nearly a quarter-century of the French Mandate which followed the break-up of the Ottoman Empire. Within the last decade Beirut has become the main port of the Eastern Mediterranean; some 1500 ships, liners from Mediterranean ports, cargo steamers and sailing vessels on coastal service, enter the port each year, bringing passengers and cargo for Lebanon and in transit for the countries of the Middle East and leaving with cotton, fruit, etc. The international airport for main and local services near the town and the free market where all currencies in the world may be bought make Beirut the most important commercial centre in the Near East. There are three universities: National, American and French. There, too, are the head offices of the United Nations dealing with relief for the Palestine refugees and the British, American and French organizations assisting in the economic development of the neighbouring states



A. J. Thornton



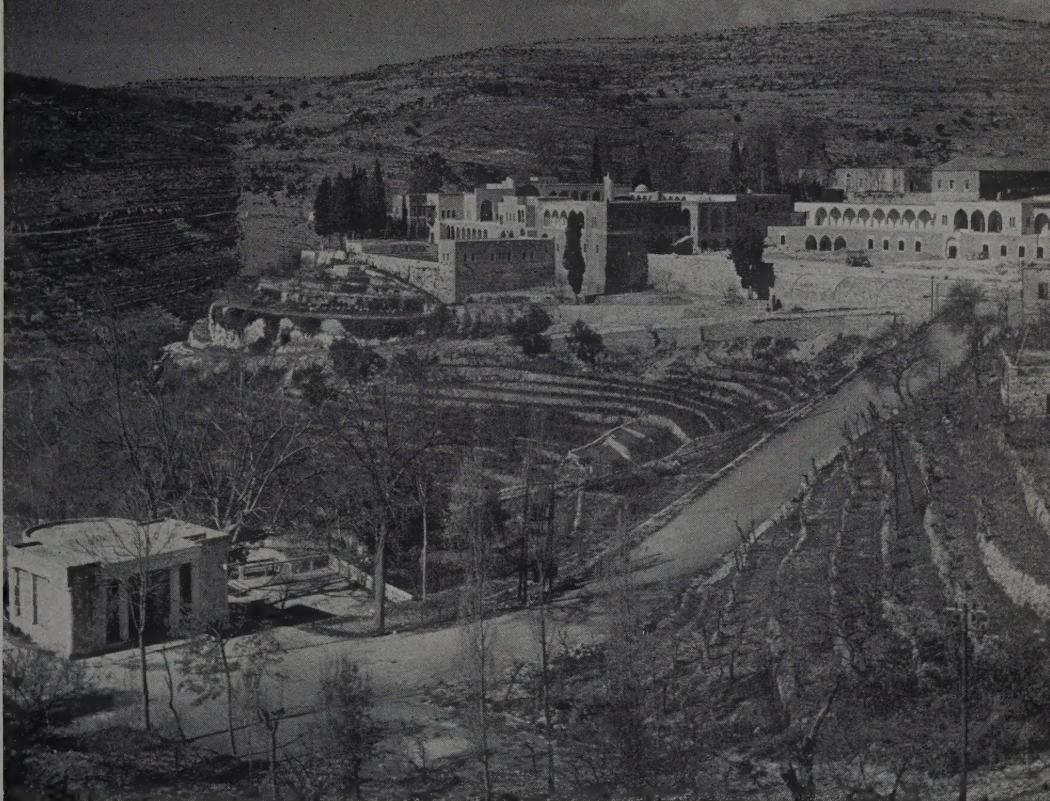
(Above) The old houses of Beirut have given place to modern concrete buildings and new and wider streets are being driven through the city. (Below) The fruit and vegetable markets of the towns and villages of Lebanon display the richly varied produce of its sub-tropical and temperate climates





(Above) Byblos, once the capital of Phoenicia and sacred city of Adonis, shows here the Phoenician wall, five yards thick, as well as the Crusader towers of an old harbour. (Below) The Roman temple at Baalbek with the six remaining columns of the sanctuary of Jupiter and the so-called temple of Bacchus





The terraced foothills of Southern Lebanon and the palace of the Amir Beshir II, a local ruling prince, who in 1861 achieved a measure of autonomy under the Turks for certain mountain districts

Ancient Lebanon, from Phoenician times onwards, formed part of neighbouring empires and was conquered in turn by Egyptians, Assyrians, Greeks and Romans. The Romans and Byzantines governed it for 700 years; their Arab and Turkish successors for 900 (with an interval of Crusader rule); and the Ottomans for 400, ending in 1917. Modern Lebanon stretches along the coast of the Levant for about a hundred miles and nowhere is the country more than forty miles wide; it is dominated throughout its length by the range of the Lebanon mountains, rising in the north to 10,000 feet. To the east lies a fertile valley at nearly 3000 feet above sea level, giving rise to the Asi (Orontes) and Litani rivers which flow north and south. Beyond them are the Anti-Lebanon mountains and Mount Hermon, forming a barrier against the desert and the

political boundary with Syria. The western slopes of the Lebanon Mountains, which in many places reach to the sea, are more heavily populated than the eastern and more cultivated. There are many rivers filled by an abundant rainfall which causes soil erosion; for this reason the fields are skilfully terraced even on the steepest slopes, where grain, vines and fruit trees are grown. In the higher ranges are cedar, oak and pine forests and throughout the country a rich flora is to be found. Near the sea-coast are groves of oranges and bananas and other sub-tropical fruits and vegetables, and to the north and south spread plains of corn and cotton. Corn has to be imported to supply fully the needs of the population; but fruit and vegetables are exported and apple-growing has of recent years become a major industry



The people of Lebanon are of the Arab World, but bear the mark in race and civilization of many conquerors and settlers. The sects of Eastern Christianity and of unorthodox Islam have maintained their identity in the protection of the mountains. In more recent times Western schools and missions have raised the standard of literacy and knowledge. The Lebanese have, therefore, contributed fully to the renaissance in Arabic letters and have assisted in the development of the Middle Eastern countries. The population numbers only 1,250,000 but there are as many who have emigrated, notably to the United States, Latin America, West Africa and Australia, and still keep touch with their homeland. It is the policy of Lebanon, with a Christian President of the Republic and a Moslem Prime Minister and a cabinet representing the various communities, to preserve a balanced population, half Christian and half Moslem. This hospitable country has taken in refugees from Armenia, Kurdistan and more recently from Palestine, and the refugees are causing a serious economic and social problem. (Left) A street in Saida, better known as Sidon, in Southern Lebanon. (Below) Round hollow loaves of wheat or maize flour are the baker's craft in all countries of the Near East

